

BLM Cave Program Mobile Exhibit

Users Guide and Instructions

BLM-NTC

August 2017

Introduction

The BLM Mobile Cave Program Exhibit is a traveling exhibit that can be used to introduce the public to the BLM's Karst and Cave Program. It can be taken to audiences in virtually any location. It can be set up in both indoor and outdoor venues. The exhibit is self-contained in a 14 foot cargo trailer. The exhibit is ADA compliant and may be used by persons with mobility impairments.

A companion video, showing the set-up, operations and tear down of the exhibit is available from BLM-NTC.

Site Requirements

1. The exhibit requires a minimum of a 40 X 50 foot space to set up and operate. The space should be reasonably level, and free of trip hazards or sharp objects. A minimum overhead clearance of 12 feet is required. Beware of low tree branches, overhead wires and other obstructions.
2. In outdoor settings the exhibit operates off a continuously running, large generator. Make sure you will not have noise sensitive neighbors. The generator produces around 70-75 dBA, roughly equivalent to a shop vacuum cleaner.
3. In indoor settings, you will need access to both 220 and 110 volt power sources.
4. You will want five to seven (5 – 7) people to assist with set up and removal. This exhibit and its components are large and heavy and it requires some good strength and mobility to handle.
5. You will want a minimum of three people to operate the exhibit once it is set up.
6. You should plan on providing 1-2 folding tables and 2-4 folding chairs for use while operating the exhibit.

7. At least one person present for all operations must be experienced and proficient at using gasoline powered generators in the field, unless you have the benefit of both 220 and 110 volt power on site.
8. You are responsible for making all arrangements for picking up the trailer and delivering after your event.



Tow Vehicle Requirements

(Figure 1)

To move the exhibit trailer, your tow vehicle must meet the following requirements:

1. A minimum of a $\frac{3}{4}$ ton truck or van, preferably with a factory installed towing package.

2. A frame mounted hitch. Bumper hitches are not acceptable. Receiver hitches must be at least two inches.



Fig. 2

3. A 2 and 5/16 inch towing ball in good condition.
4. A 7 way, flat pin receptacle to accept trailer wiring plug.
5. An experienced, properly licensed driver for pulling heavy trailers.

The Trailer

The trailer is a 14 foot, tandem axel cargo trailer with a side door on the right side. The rear door is a full width, fold down ramp.

All three doors are secured with a combination padlock. The combination for all three is **8380**.

This is the subject code for the BLM's Karst and Cave Program.



(Fig 3)



There is a rabbet cut piece of lumber that fills the gap between the top of the ramp and floor of the trailer, making it easier to wheel the components in and out of the trailer. ***It is very important to remove this gap filler before attempting to close the rear door.***



Figures 4,5,6 – Rabbet cut gap filler between floor of trailer and ramp.

The spare tire for the trailer is accessible through the side door when the trailer is loaded.

Also located inside the side door is a lock and key for locking the trailer hitch. The hitch should be locked if the trailer is left unattended in a public location, whether or not is attached to the tow vehicle.



Figure 7 – Hitch lock and key

Exhibit Trailer Inventory

- Exhibit tent structure (1).
- Generac GP 17500e generator (1).
- Honda EU 3000 generator (1).
- Mobile cool air conditioning units (2).
- Air conditioner ducting (4).
- 220 volt and 110 volt extension cords.
- Stake down kit with stakes and hammer.
- Packet of interpretive signs containing 11 signs.
- Inflator fans (2).
- Flashlights for visitors. (check batteries, replenish as needed)
- Buckets to store/collect flashlights. (2)
- Disinfecting wipes. (Consumable/disposable, replenish as needed)
- Small water feature (optional)
- Bats on monofilament for hanging in bat corridor. (Optional)
- Bluetooth speaker for bat and other cave sounds. (Optional).
- Banners (Optional or substitute your own.)
- Manuals for generators and AC units.

Unloading the Trailer.

1. Park the trailer as close as possible to your exhibit space.
2. Unload the trailer, removing small, lightweight items through back and side doors.

3. Once smaller items have been removed and set aside, the trailer will look like this -



Figure 8. Heavy items in the trailer. The tent structure can be seen on the hand truck at the front of the trailer. Next are the two air conditioning units, secured with cargo straps. At the rear is the Generac 17500e generator.

4. Carefully remove the generator, AC units and set aside. The castors on the AC units have brakes. Be sure to release brakes before trying to roll the AC units out of the trailer.
5. Then wheel the tent structure to desired location. See start location in Figure 9.

Setting Up the Exhibit Structure

1. Place the handcart with the exhibit tent structure at the location to starting location shown in Figure 9. Remove the tent from the hand truck. Tent is wrapped in a protective tarp that must be removed (see Figure 10). Begin unrolling the tent in the direction shown in yellow in Figure 9. Once rolled out to full length, unroll the tent to its full width. Figures 11, 13 and 13 are photos of the unrolling process.

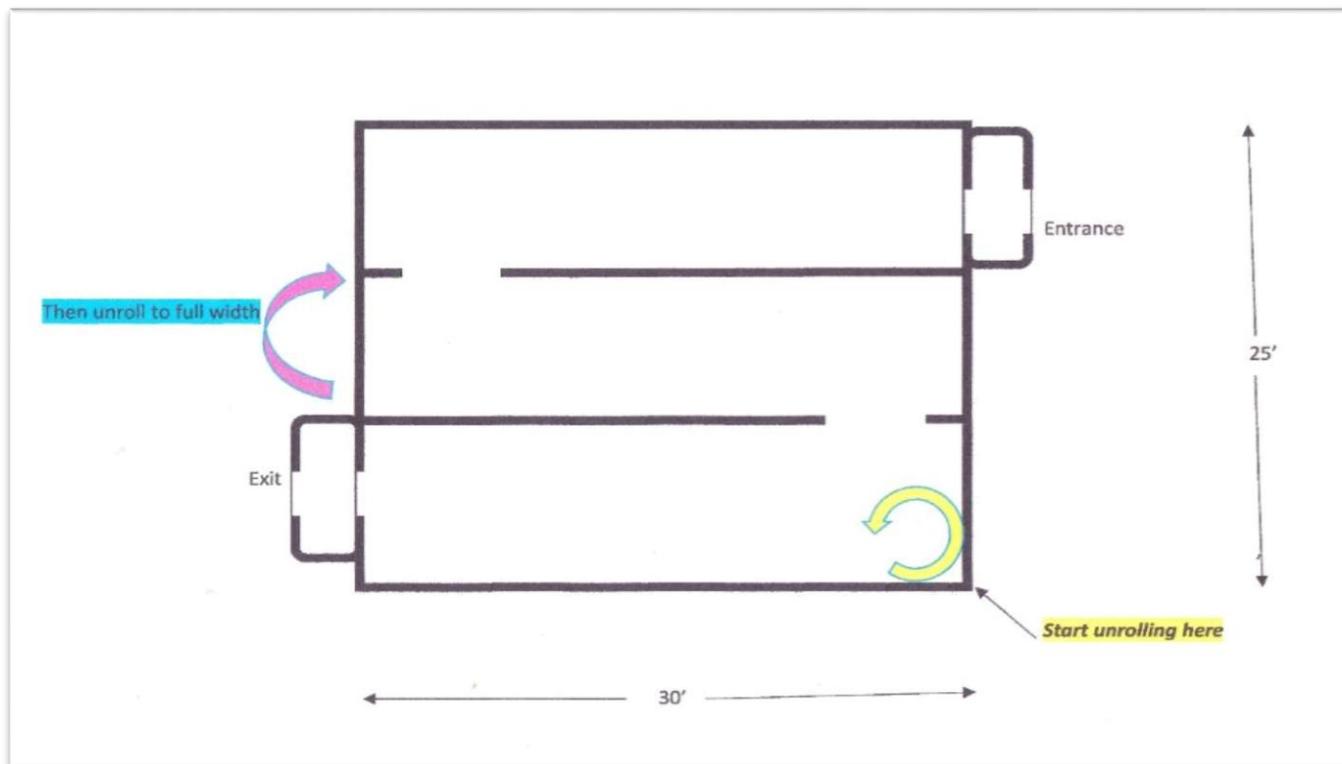


Figure 9. How to unroll the tent.

Figure 11
Removal of protective tarp.



Figure 12
Unrolling tent to length.



Figure 13. Unrolling tent to width.

2. Locate and close the eight (8) deflator vents. These are found on the bottom tent, four on each side and one each on the entrance and exit ends of the tent. These are long, narrow Velcro closure flaps covering a zipper. Zippers and flaps must be closed (Figure 14).



Figure 14. Closing the deflator vents.

3. Find a location for the large, Generac generator. In selecting a location for this generator, consider: Stay within extension cord lengths of both AC units and the nearest inflator fan. Public access, the generator has hot surfaces. Noise sensitivity.

If you have access to 220 & 110 volt power, you may disregard instructions about generators and plug directly into power.

4. Set up the Honda generator on the side opposite the Generac generator. Check oil and fuel levels in both generators
5. Attach an inflator fan (Figure 13) to the inflator ports as shown in Figure 14. These fans secure to the ports with Velcro.



Figure 13 Inflator fans attached to inflator port.

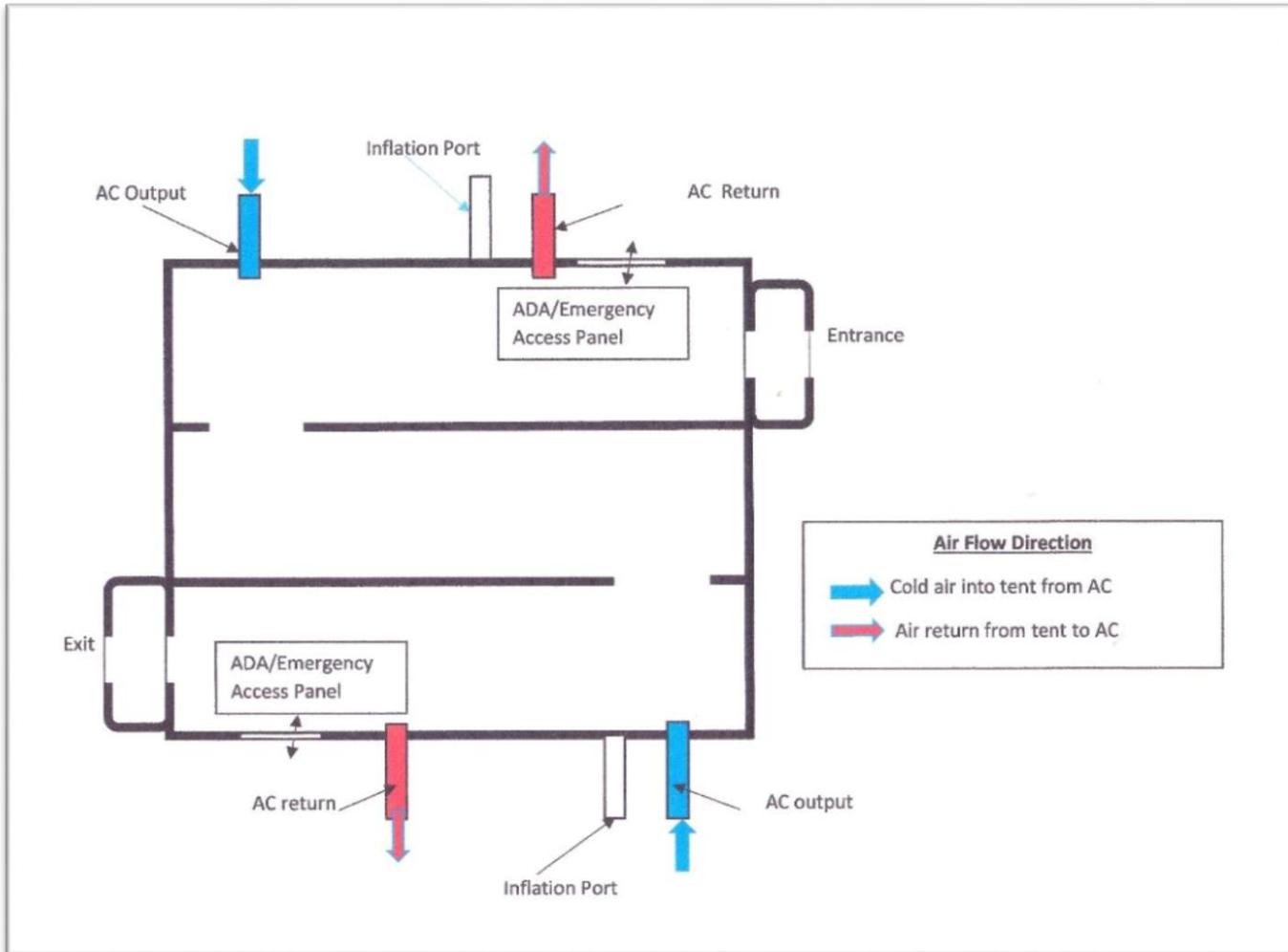


Figure 14. Air flow for inflation and air conditioning of tent. AC in and out is marked on each air conditioning port with both the words, "AC output" & "AC return" and an arrow indicating airflow direction.

6. Plug in inflator fans into generators 110 volt outlet. Start generators and begin inflating the tent. As the tent inflates, it may be necessary to pull out the tent to remove folds and stress points so the structure inflates fully and uniformly.
7. Once the tent is fully inflated, only one fan is needed to maintain inflation. At this point, you may shut down the Honda generator by shutting off the fuel valve, and tie off the inflation port it was supplying using one of the upper tie down straps or other handy tie off material, as shown in Figure 15. Leave Honda generator

in place to provide maintenance of inflation should the Generac generator fail.



Figure 15. Tie off the inflator port and shut down fan and Honda generator.

8. Once the tent is inflated, if winds are expected or the exhibit will be left up for multiple days, stake the tent down using the stake loops on the bottom perimeter of the tent and the upper tied down straps as shown:



9. Locate an air conditioning unit on each side of the tent, within reach of the AC output duct.

10. Connect the air conditioners to the AC ports. The ports and the AC units are labeled “AC output” & “AC Return” with arrows indicating the direction of airflow (Figures 15) Connect the AC output directly to the AC output port. Connect the AC return port to the return on the AC using one of the white AC ducts. On the “AC return” duct, it is important to insert the white AC duct all the way into the AC return port (Figure 16). The AC return is the low pressure side of the system and the AC return port may collapse if it is not supported by the wire in the duct.



Figure 15. Air outlets on AC and the AC ports are labeled and have arrows indicating direction of airflow.



Figure 16. Air conditioners connected and running. Note: AC output is connected directly to AC output port. White AC duct is inserted fully into the AC return port to prevent collapse of the port. Tie the AC return port around the white duct to prevent leakage.

11. Run 220 volt extension cord to the AC unit on the opposite side of the tent from the Generac generator. Cord may be routed around the tent or placed over the top of tent. **Do not route extension cord under the tent as this will present both a trip hazard and electrical hazard inside the exhibit!**
12. Start the Generac generator by first opening the fuel valve. The rest of the startup procedure is shown on placards on the generator or see the Generac User's Manual, located in the trailer.
13. There is a digital thermostat attached to each AC unit by a long, lead wire (Figure 17). Set the thermostat to the average annual temperature for your location. Place the thermostat into the cave, routing through the nearest deflator vent. Open the deflator port Velcro flap and pass the thermostat under the

inflated wall and into the cave. Thermostat should be hidden by some loose tent material on the cave interior (Figure 18).



Figures 17 & 18. Thermostat set to 65 degrees and located inside the cave at the corner and being covered with loose tent material.

Preparing the Interior of the Tent.

1. Locate the two ADA/Emergency Access Panels and open them (Figure 19). This will make outfitting the interior of the tent much easier. Also, having good, LED headlamps for personnel working in the tent will make it easier as well.



Figure 19. Opening the ADA/Emergency Access panels. Outer panel is zippered, Inner panel secured by Velcro.

2. Locate the envelop/pouch containing 11 interpretive signs (Figure 20)



Figure 20. Pouch containing interpretive signs.

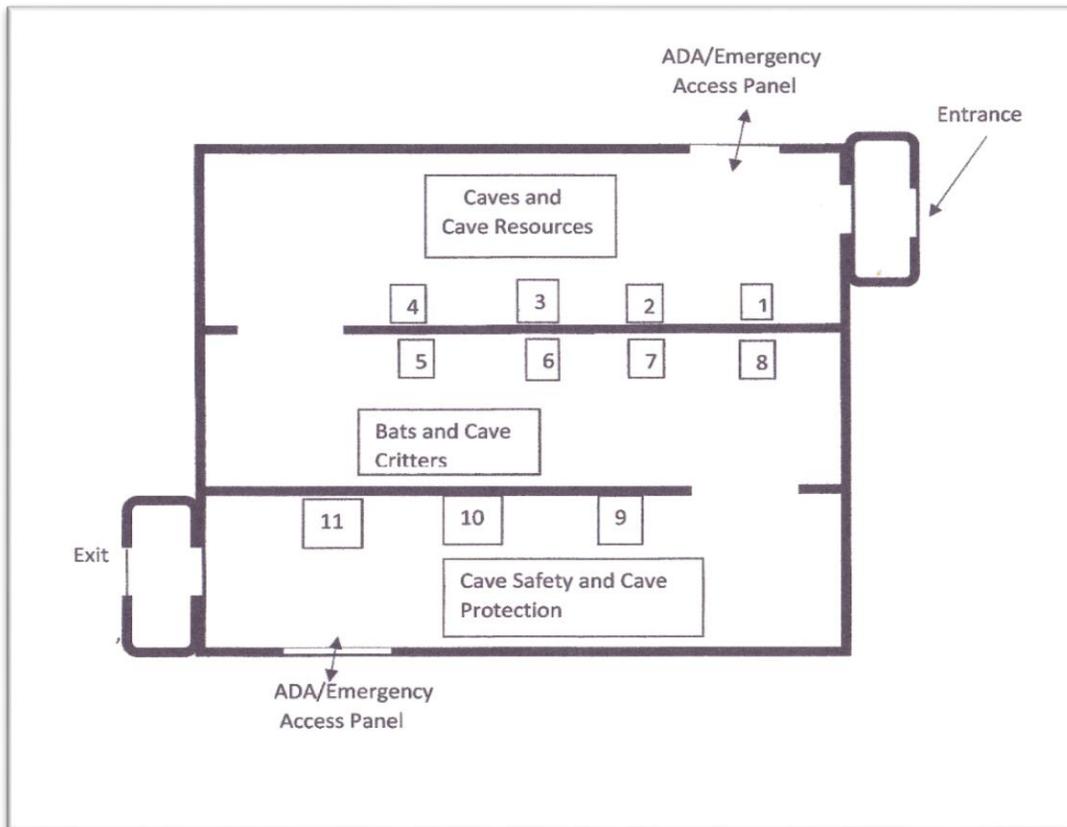


Figure 21. Layout of interpretive media and themes on the tent interior.

3. The cave interior has three corridors. Each has its own interpretive theme. The first corridor is about caves and cave resources. The center passage is concerned with bats and other cave fauna, the last corridor, leading to the exit addresses the topics of cave preservation and personal safety in caves. (Figure 21)
4. The interpretive signs are attached to the interior of the cave walls by Velcro strips attached to the back of the signs and cave walls. The location of the signs is shown on Figure 21. Each sign location has a number written on the wall, between the Velcro strips (Figure 22). These correspond to the numbers written on the back of each sign. Place each sign at its designated location.

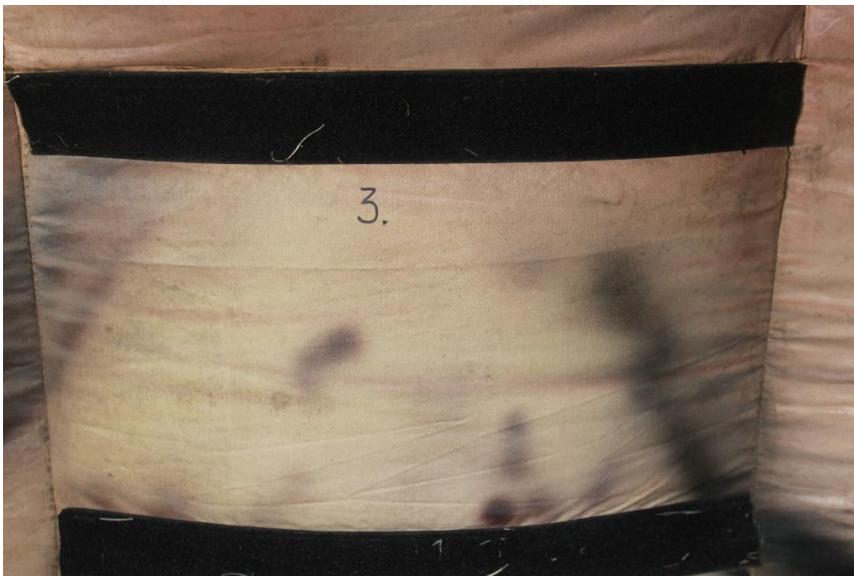


Figure 21. Each location for an interpretive sign is marked by Velcro Strips and the number corresponding to the number on the back of the sign.

5. There are some small plastic bats provided with the exhibit. These bats have monofilament line attached. These may be suspended from the ceiling near the start of the center corridor. This is a cave exhibit, not a Halloween spook alley. Keep the bats

high and off to the sides where they will not entangle visitors (Figure 23).



Figure 23. Attaching bats in center passage of the cave.

6. A Bluetooth speaker, camouflaged as rock is provided with the exhibit. This may be used to provide bat sounds, water, and other natural cave sounds you may want to insert into the exhibit using a Bluetooth device.
7. Small water features may be added to the cave at your discretion.
8. Close both flaps on the ADA/Emergency Access panels. The exhibit is ready for visitation.

Operating the Exhibit for Visitors

1. Set up a folding table and 1-2 chairs (not included in exhibit materials, provide your own) near the cave entrance. The size of the table may vary depending on how much materials, maps, brochures, etc. you may want to display. Place one bucket with the working flashlights on the table.
2. Each visitor or small group of 1-3 visitors should be issued a flashlight. Explain there are signs in the tent that will require the visitor to do something – lift up the cover flap to reveal the entire message.
3. The crawl through entrance/exit are the preferred access points. For visitors with mobility impairments that cannot use the crawl through access points, you may open the ADA/Emergency Access Panels to facilitate entry and exit.
4. Have another chair or two positioned near the exit. Keep a bucket at this location to collect flashlights.
5. Decontaminate the flashlights using disinfecting wipes while explaining to the visitor the importance of decontamination of clothing and equipment when exiting a cave. The decontamination of flashlights is a minimum requirement when operating the display. Depending on the objectives of your particular use of the display more complete decontamination can be demonstrated or required.
6. Number of visitors at one time is limited by the number of flashlights. To provide a quality experience there should be not more than 12 persons at a time spread through the exhibit.
7. **If emergency evacuation or a medical evacuation of the exhibit is required, fully open the ADA/Emergency Access Panels to facilitate a safe and orderly operation.**

Taking Down and Repacking the Exhibit.

1. Open ADA/Emergency Access panels. Remove ALL materials from the cave interior – Interpretive signs, bats, speaker, water features. **Recover the thermostats and place them on their AC unit.** Once you have double/triple checked the interior is empty, close the ADA/Emergency Access panels. Place ALL interpretive signs back in the pouch (Figure 20, page 19).
2. Shut down Generac generator by closing the fuel valve and allowing the generator to run through all the gas remaining in the carburetor and fuel lines.
3. Disconnect 220 power cords from the AD units. Coil and stow cords.
4. Disconnect AC units from AC ports and ducts.
5. Retrieve the white AC ducts and tie them for transport (Figure 24)



Figure 24, Collapse and tie white AC ducts for ease of transport.

6. Unplug the inflator fans and remove them from the inflator ports. Untie the inflator fan port you tied off (Figure 15, page 14). Coil and stow the extension cords. Coil the inflator fan cords and tuck them under the handle on the fan.
7. Open all eight deflator vents. Take a break and allow the tent to deflate down to where it is 1-2 feet high.
8. Start on the long edge of the tent, nearest the entrance and with 5+ people begin rolling up the tent. Roll the tent as shown in the diagram in Figure 25 and as shown in the photograph in Figure 26.

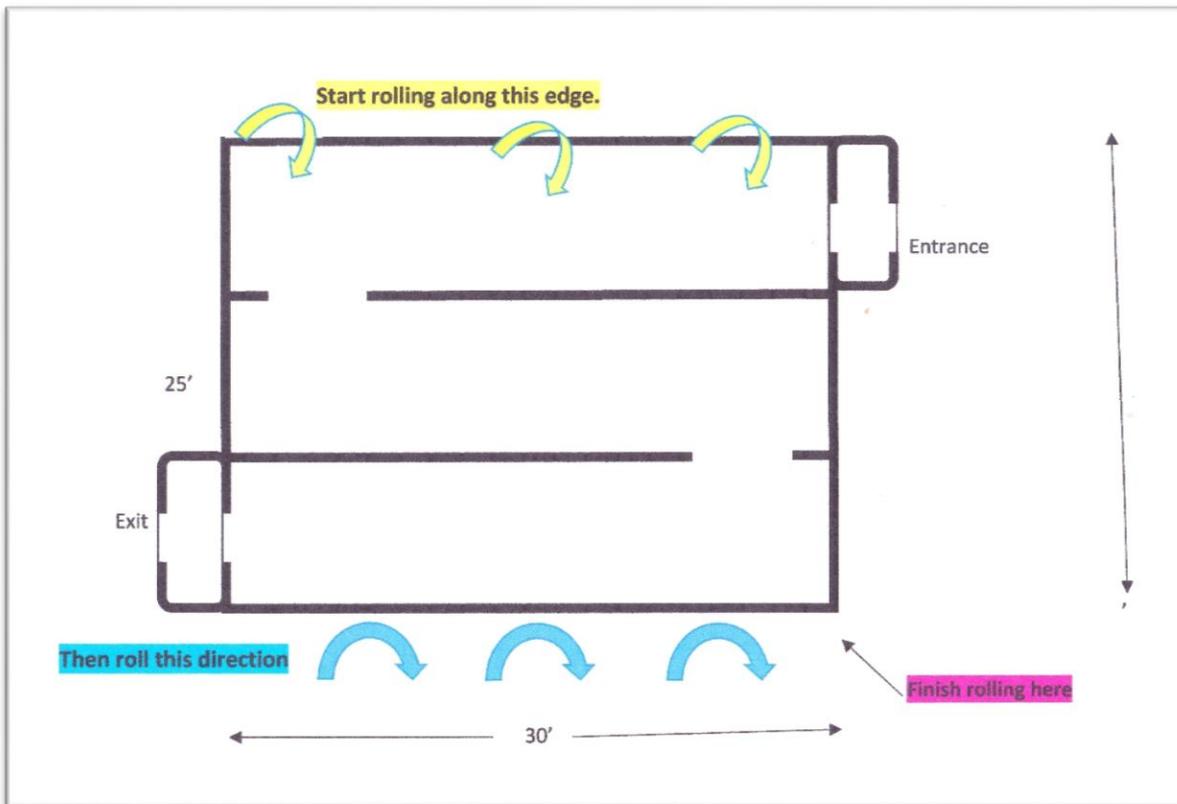


Figure 25. How to roll up the tent.



Figure 26. Rolling up the tent. First rolling the long side, nearest entrance. Finish by rolling from the end with the exit toward the entrance side.

9. Roll the entire tent onto the protective tarp and secure the tarp to cover and protect the tent (Figure 27). Place tent on hand truck.



Figure 27. Securing the protective tarp covering the tent using the straps and buckles sewn to the tarp.

Loading the Trailer

1. The proper location of the tent and AC units are shown on the floor of the trailer outlined with yellow duct tape and labeled (Figure 28)



Figure 28. Proper locations for the tent and AC units are marked in the trailer.

2. Load tent with handcart to the very front of the trailer as shown



3. Next load the two AC units. **Note the AC units are placed in the trailer so the thermostat leads are to the center of the trailer (Figure 29).** This is important – if the thermostat leads are up against the wall, they will be broken. Remember to set brakes on the AC unit castors and secure AC units to trailer wall using the straps and D-rings (Figure 30).



Figure 29. AC units loaded, castor brakes set. Notice thermostat leads are toward the center of the trailer so they will not be damaged.

4. Next load the Generac generator as shown in Figure 30.



Figure 30. AC units and Generac generator loaded properly in the trailer. Note cargo straps secure these items to the trailer walls. Remember to set brakes on all wheels and casters.

5. Remove the gap filler from the gap between the trailer floor and ramp door (Figure 4,5,6, on page 6). Stow gap filler in trailer.
6. Now you may load remaining items in the available space through both the side and rear trailer doors.
7. Once all trailer inventory (page 7) is loaded and accounted for, close the trailer doors. If the rear door offers resistance to closing, check to make sure you completed Step 5 above. Secure the doors with the combination padlocks.

Don't forget to record and report your outreach and visitation in RMIS!